

*09/78303*

(FILE 'HOME' ENTERED AT 11:52:03 ON 30 NOV 2001)

FILE 'HCAPLUS' ENTERED AT 11:52:09 ON 30 NOV 2001

L1        23988 S SUPERCRITICAL  
L2        607109 S TRIGLYCERIDE OR GLYCERIDE FAT OR OIL  
L3        698309 S CATALYST  
L4        49626 S NICKEL AND L3  
L5        18 S L1 AND L2 AND L4

FILE 'STNGUIDE' ENTERED AT 11:54:23 ON 30 NOV 2001

FILE 'HCAPLUS' ENTERED AT 12:00:01 ON 30 NOV 2001

L6        1 S ES2124166/PN  
L7        138 S L1 AND L2 AND L3  
L8        16 S L7 AND (ALCOHOL OR MONOALCOHOL OR MONO-ALCOHOL)

L5 ANSWER 1 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
 AN 2001:615572 HCAPLUS  
 DN 135:182359  
 TI Process for producing fatty acid esters and fuels comprising fatty acid ester  
 IN Tateno, Tatsuo; Sasaki, Toshio  
 PA Sumitomo Chemical Company, Limited, Japan  
 SO Eur. Pat. Appl., 10 pp.  
 CODEN: EPXXDW  
 DT Patent  
 LA English  
 IC ICM C11C003-00  
 ICS C10L001-18; C07C067-03; B01J003-00  
 CC 45-3 (Industrial Organic Chemicals, Leather, Fats, and Waxes)  
 FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1126011	A2	20010822	EP 2001-1103503	20010215
	EP 1126011	A3	20010829		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	JP 2001226694	A2	20010821	JP 2000-39318	20000217
	JP 2001302584	A2	20011031	JP 2001-41393	20010219
PRAI	JP 2000-39316	A	20000217		
	JP 2000-39318	A	20000217		
AB	The process for producing a fatty acid ester with a high yield from an oil or fat (soybean oil) and an alc. (MeOH) which comprises reacting an oil or fat with an alc. in the presence of a solid base catalyst (anhyd. Na carbonate) under conditions in which .gt;req.1 of the oil or fat and the alc. is in a supercrit. state at a temp. >260.degree.C.				
ST	soybean oil ester fuel; sodium carbonate catalyst fatty acid ester; supercrit state fatty acid ester				
IT	Fatty acids, preparation RL: IMF (Industrial manufacture); PREP (Preparation) (esters; process for producing fatty acid esters and fuels comprising fatty acid ester)				
IT	Fuels <b>Supercritical</b> phenomena (process for producing fatty acid esters and fuels comprising fatty acid ester)				
IT	Soybean oil RL: IMF (Industrial manufacture); PREP (Preparation) (reaction products with alcs.; process for producing fatty acid esters and fuels comprising fatty acid ester)				
IT	471-34-1, Calcium carbonate, uses 497-19-8, Sodium carbonate, uses 1305-62-0, Calcium hydroxide, uses 1305-78-8, Calcium oxide, uses 1309-48-4, Magnesium oxide, uses 1313-99-1, Nickel oxide, uses RL: CAT (Catalyst use); USES (Uses) (process for producing fatty acid esters and fuels comprising fatty acid ester)				
IT	67-56-1DP, Methanol, reaction products with oil and fat RL: IMF (Industrial manufacture); PREP (Preparation) (process for producing fatty acid esters and fuels comprising fatty acid ester)				

L5 ANSWER 2 OF 18 HCAPLUS COPYRIGHT 2001 ACS

AN 2001:603741 HCAPLUS  
DN 135:182358  
TI Manufacture of fatty acid esters and fuel containing the fatty acid esters

IN Tateno, Tatsuo; Sasaki, Toshio  
PA Sumitomo Chemical Co., Ltd., Japan  
SO Jpn. Kokai Tokkyo Koho, 7 pp.  
CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM C11C003-10

ICS B01J023-755; C07B061-00; C07C067-03; C07C069-58; C10L001-02;  
C10L001-08; C10L001-18; C10M105-34; C11B013-00; C10N040-25

CC 45-3 (Industrial Organic Chemicals, Leather, Fats, and Waxes)

Section cross-reference(s): 51

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2001226694	A2	20010821	JP 2000-39318	20000217
	EP 1126011	A2	20010822	EP 2001-1103503	20010215
	EP 1126011	A3	20010829		

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,  
IE, SI, LT, LV, FI, RO

US 2001042340 A1 20011122 US 2001-783031 20010215

PRAI JP 2000-39316 A 20000217  
JP 2000-39318 A 20000217

OS MARPAT 135:182358

AB The esters useful fuels, diesel fuels, lube oil base or fuel additives are manufd. by reacting oils and fats with alcs. using an Ni-contg. solid catalyst under supercrit. condition. Heating 0.861 g soya oil, 1.242 g MeOH, and 10.9 mg NiO-Ni2O3 mixt. in a stainless reactor at 300.degree. for 10 min gave 98% yield soya fatty acid Me esters and 91% yield glycerol.

ST fatty acid ester manuf fuel; nickel catalyst fat oil transesterification; soya fatty acid Me ester manuf

IT Lubricating oils

(base; manuf. of fatty acid esters and fuel contg. the fatty acid esters)

IT Fatty acids, preparation

RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(esters; manuf. of fatty acid esters and fuel contg. the fatty acid esters)

IT Diesel fuel

Fuel additives

Fuels

Transesterification catalysts

(manuf. of fatty acid esters and fuel contg. the fatty acid esters)

IT Alcohols, reactions

Soybean oil

RL: RCT (Reactant)

(manuf. of fatty acid esters and fuel contg. the fatty acid esters)

IT Wastes

(oil, reactants; manuf. of fatty acid esters and fuel contg. the fatty acid esters)

IT Fats and Glyceridic oils, reactions

RL: RCT (Reactant)

(oils; manuf. of fatty acid esters and fuel contg. the fatty

acid esters)  
IT Fatty acids, preparation  
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(soya, Me esters; manuf. of fatty acid esters and fuel contg. the fatty acid esters)  
IT 56-81-5P, Glycerol, preparation  
RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
(manuf. of fatty acid esters and fuel contg. the fatty acid esters)  
IT 67-56-1, Methanol, reactions  
RL: RCT (Reactant)  
(manuf. of fatty acid esters and fuel contg. the fatty acid esters)  
IT 1313-99-1, Nickel oxide, uses 1314-06-3, Nickel trioxide  
RL: CAT (Catalyst use); USES (Uses)  
(transesterification catalysts; manuf. of fatty acid esters and fuel contg. the fatty acid esters)

L5 ANSWER 3 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
AN 2001:409893 HCAPLUS  
DN 135:197151  
TI Nickel-alumina composite aerogels as liquid-phase hydrogenation catalysts  
AU Suh, D. J.; Park, T.-J.; Lee, S.-H.; Kim, K.-L.  
CS Clean Technology Research Center, Korea Institute of Science and Technology, Cheongryang, Seoul, 136-791, S. Korea  
SO J. Non-Cryst. Solids (2001), 285(1-3), 309-316  
CODEN: JNCSBJ; ISSN: 0022-3093  
PB Elsevier Science B.V.  
DT Journal  
LA English  
CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)  
AB Mesoporous and well-dispersed nickel-alumina composite aerogels with high surface area have been prepd. by CO<sub>2</sub> supercrit. drying of alcogels obtained by the fast sol-gel process. They were evaluated as catalysts in a batch reactor for the liq.-phase hydrogenation of benzophenone and soybean oil and showed excellent activity and accessibility of the metal particles. They were also characterized by nitrogen adsorption-desorption, X-ray diffraction (XRD), XPS (XPS), and transmission electron microscopy (TEM) to explain their excellent catalytic performance in comparison with other alumina-supported nickel catalysts.  
ST nickel alumina aerogel liq phase hydrogenation catalyst ; benzophenone soybean oil hydrogenation  
IT Soybean oil  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(hydrogenated; nickel-alumina composite aerogels as liq.-phase hydrogenation catalysts of soybean oil)  
IT Sol-gel processing  
(in prepn. of nickel-alumina composite aerogels as liq.-phase hydrogenation catalysts)  
IT Hydrogenation catalysts  
(liq.-phase; nickel-alumina composite aerogels as liq.-phase hydrogenation catalysts)  
IT Aerogels  
(nickel-alumina composite aerogels as liq.-phase

hydrogenation catalysts)

IT Soybean oil  
RL: RCT (Reactant)  
(nickel-alumina composite aerogels as liq.-phase hydrogenation catalysts of soybean oil)

IT Microstructure  
Pore size  
Surface area  
X-ray photoelectron spectra  
(of nickel-alumina composite aerogels as liq.-phase hydrogenation catalysts)

IT 373-02-4, Nickel acetate  
RL: CAT (Catalyst use); USES (Uses)  
(in sol-gel process with aluminum sec-butoxide; nickel-alumina composite aerogels as liq.-phase hydrogenation catalysts)

IT 2269-22-9  
RL: CAT (Catalyst use); USES (Uses)  
(in sol-gel process with nickel acetate; nickel-alumina composite aerogels as liq.-phase hydrogenation catalysts)

IT 13138-45-9, Nickel nitrate  
RL: CAT (Catalyst use); USES (Uses)  
(nickel-alumina composite aerogels as liq.-phase hydrogenation catalysts)

IT 119-61-9, Benzophenone, reactions  
RL: RCT (Reactant)  
(nickel-alumina composite aerogels as liq.-phase hydrogenation catalysts for benzophenone)

IT 91-01-0P, Benzhydrol  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation)  
(nickel-alumina composite aerogels as liq.-phase hydrogenation catalysts for benzophenone)

IT 101-81-5P, Diphenylmethane  
RL: SPN (Synthetic preparation); PREP (Preparation)  
(nickel-alumina composite aerogels as liq.-phase hydrogenation catalysts for benzophenone)

IT 1344-28-1, .gamma.-Alumina, uses  
RL: CAT (Catalyst use); USES (Uses)  
(.gamma.- catalyst support; nickel-alumina composite aerogels as liq.-phase hydrogenation catalysts)

RE.CNT 11

RE

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- (2) Coenen, J; Ind Eng Chem Fundam 1986, V25, P43 HCPLUS
- (3) Kim, J; Appl Catal A 2000, V197, P191 HCPLUS
- (4) Kumbhar, P; Catal Lett 1991, V10, P131 HCPLUS
- (5) Kumbhar, P; Stud Surf Sci Catal 1993, V78, P251 HCPLUS
- (6) Pajonk, G; Catal Today 1997, V35, P319 HCPLUS
- (7) Schneider, M; Catal Rev Sci Eng 1995, V37, P515 HCPLUS
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- (9) Suh, D; Chem Mater 1997, V9, P1903 HCPLUS
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L5 ANSWER 4 OF 18 HCPLUS COPYRIGHT 2001 ACS

AN 2001:169729 HCPLUS

DN 134:352501

TI Hydrogenation of vegetable oils using mixtures of supercritical carbon dioxide and hydrogen

AU King, Jerry W.; Holliday, Russell L.; List, Gary R.; Snyder, Janet M.

CS Food Quality and Safety Research Unit, NCAUR, ARS, USDA, Peoria, IL, 61604, USA

SO J. Am. Oil Chem. Soc. (2001), 78(2), 107-113  
CODEN: JAOCAT; ISSN: 0003-021X

PB AOCS Press

DT Journal

LA English

CC 17-9 (Food and Feed Chemistry)

AB Hydrogenation of vegetable oils under supercrit. conditions can involve a homogeneous one-phase system, or alternatively 2 supercrit. components in the presence of a condensed phase consisting of oil and a solid catalyst. The former operation is usually conducted in flow reactors while the latter mode is more amenable to stirred, batch-reactor technol. Although many advantages have been cited for the 1-phase hydrogenation of oils or oleochems. using supercrit. carbon dioxide or propane, its ultimate productivity is limited by the oil solv. in the supercrit. fluid phase as well as unconventional conditions that affect the hydrogenation. In this study, a dead-end reactor has been utilized in conjunction with a head-space consisting of either a binary fluid phase consisting of varying amts. of carbon dioxide mixed with hydrogen or neat hydrogen for comparison purposes. Reaction pressures up to 2000 psi and temps. in the range of 120-140.degree.C have been utilized with a conventional nickel catalyst to hydrogenate soybean oil. Depending on the chosen reaction conditions, a wide variety of end products can be produced having different iodine values, percentage trans fatty acid content, and dropping points or solid fat indexes. Although addn. of carbon dioxide to the fluid phase contg. hydrogen retards the overall reaction rate in most of the studied cases, the majority of products have low trans fatty acid content, consistent with a nonselective mode of hydrogenation.

ST vegetable oil hydrogenation supercrit carbon dioxide

IT Catalysts  
(hydrogenation of vegetable oils using mixts. of supercrit. carbon dioxide and hydrogen)

IT Soybean oil  
RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(hydrogenation of, using mixts. of supercrit. carbon dioxide and hydrogen)

IT Hydrogenation  
(of vegetable oils using mixts. of supercrit. carbon dioxide and hydrogen)

IT Extraction  
(supercrit.; hydrogenation of vegetable oils using mixts. of supercrit. carbon dioxide and hydrogen)

IT Fatty acids, biological studies  
RL: BOC (Biological occurrence); BIOL (Biological study); OCCU (Occurrence)  
(unsatd., trans-; hydrogenation of vegetable oils using mixts. of supercrit. carbon dioxide and hydrogen)

IT Fats and Glyceridic oils, processes  
RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(vegetable; hydrogenation of, using mixts. of supercrit.)

carbon dioxide and hydrogen)

IT 12408-02-5, Hydrogen ion, biological studies  
RL: BUU (Biological use, unclassified); BIOL (Biological study); USES  
(Uses)  
(hydrogenation of vegetable oils using mixts. of  
**supercrit.** carbon dioxide and)

IT 124-38-9, Carbon dioxide, biological studies  
RL: BUU (Biological use, unclassified); BIOL (Biological study); USES  
(Uses)  
(hydrogenation of vegetable oils using mixts. of  
**supercrit.** carbon dioxide and hydrogen)

RE.CNT 25

RE

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(2) Albright, L; J Am Oil Chem Soc 1962, V39, P14 HCPLUS  
(3) Andersson, M; Proceedings of the 6th Meeting on Supercritical Fluids 1999,  
P195  
(4) Anon; Official and Recommended Methods of the American Oil Chemists'  
Society 1989, Methods Cc-18-80, Cd-10-57  
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the Fats and Oils Industry 1986, P1  
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1999, P1  
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Fluid 1997, P511  
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(24) Ting, P; US 6020019 2000 HCPLUS  
(25) Van den Hark, S; J Am Oil Chem Soc 1999, V76, P1363 HCPLUS

L5 ANSWER 5 OF 18 HCPLUS COPYRIGHT 2001 ACS  
AN 2000:28872 HCPLUS  
DN 132:66387

TI Applicability of **supercritical** water as a reaction medium for  
desulfurization and demetallization of gas oil

AU Vogelaar, B. M.; Makkee, M.; Moulijn, J. A.

CS Section Industrial Catalysis, Department of Chemical Process Technology,  
Faculty of Applied Sciences, Delft University of Technology, Delft, 2628  
BL, Neth.

SO Fuel Process. Technol. (1999), 61(3), 265-277  
CODEN: FPTEDY; ISSN: 0378-3820

PB Elsevier Science B.V.

DT Journal  
LA English  
CC 51-9 (Fossil Fuels, Derivatives, and Related Products)  
AB In this study, the potential of **supercrit.** water (SCW) was investigated, to remove sulfur and metals from gas oil, either sep. or simultaneously. The expts. were carried out in a stirred batch autoclave at 673 K and 25 MPa, using a std. hydrotreated gas oil spiked with different sulfur-, nickel- and vanadium-contg. model compds. Only non-arom. sulfur compds. will react in SCW. The obsd. degree of desulfurization is marginal. Arom. sulfur compds. are too stable and will not react. Demetallization of selected metal complexes was not obsd. The metal complexes undergo some rearrangements in SCW, but their basic structure remains intact. Desulfurization and demetallization were only obsd. in the presence of a conventional hydrotreating catalyst. Concluding, SCW alone is not a suitable reaction medium for desulfurization and/or demetallization of gas oil. This conclusion is supported by thermodynamical calcns.  
ST gas oil desulfurization demetallization **supercrit**  
water  
IT Petroleum refining  
(demetalation; **supercrit.** water as a reaction medium for desulfurization and demetallization of gas oil)  
IT Petroleum refining  
(desulfurization; **supercrit.** water as a reaction medium for desulfurization and demetallization of gas oil)  
IT Gas oils  
(**supercrit.** water as a reaction medium for desulfurization and demetallization of gas oil)  
IT 7732-18-5, Water, uses  
RL: ARG (Analytical reagent use); ARU (Analytical role, unclassified); ANST (Analytical study); USES (Uses)  
(**supercrit.** water as a reaction medium for desulfurization and demetallization of gas oil)  
RE.CNT 15  
RE  
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(15) Townsend, S; Industrial and Engineering Chemistry Research 1988, V27, P143  
HCAPLUS

AN 1999:687344 HCAPLUS  
DN 132:22223  
TI Hydrogenation of edible oil  
AU Takahashi, Yoshikazu; Yoda, Minoru  
CS Miyoshi Oil & Fat Co., Ltd., Horikiri, Katsushika-ku, Tokyo, 124-8510, Japan  
SO Nihon Yukagakkaishi (1999), 48(10), 1141-1149  
CODEN: NIYUFC; ISSN: 1341-8327  
PB Nihon Yukagaku Gakkai  
DT Journal; General Review  
LA Japanese  
CC 17-0 (Food and Feed Chemistry)  
AB A review with 36 refs. The hydrogenation of edible oil is a basic means for converting liq. oils into plastic fats at oil and fat companies. Fundamental hydrogenation and current continuous reactor using a fixed-bed catalyst and supercrit. process are discussed. New types of nickel and precious metal catalysts and current developments in reactors are presented.  
ST review edible oil fat hydrogenation  
IT Fats and Glyceridic oils, biological studies  
RL: FFD (Food or feed use); IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); BIOL (Biological study); PREP (Preparation); PROC (Process); USES (Uses)  
          (hydrogenated; hydrogenation of edible oil)  
IT Food processing  
      Hydrogenation  
          (hydrogenation of edible oil)  
IT Edible oils  
RL: PEP (Physical, engineering or chemical process); PROC (Process)  
          (hydrogenation of edible oil)  
  
L5 ANSWER 7 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
AN 1999:618420 HCAPLUS  
DN 131:288550  
TI Deactivation of NiMo/.gamma.-Al<sub>2</sub>O<sub>3</sub> catalysts for hydrodesulfurization of heavy oil  
AU Su, Ji-xin; Xiao, Tian-cun; Wang, Hai-tao; Yin, Yong-quan; Lu, Yu-li; Yang, Zhao-he  
CS Department of Environmental Engineering, Shandong University, Jinan, 250100, Peop. Rep. China  
SO Fenzi Cuihua (1999), 13(4), 297-303  
CODEN: FECUEN; ISSN: 1001-3555  
PB Kexue Chubanshe  
DT Journal  
LA Chinese  
CC 51-6 (Fossil Fuels, Derivatives, and Related Products)  
AB Spent industrial catalyst samples for hydrodesulfurization (HDS) of heavy oil were collected and treated by ultrasonic washing and supercrit. fluid extn. The samples were characterized by mean of various techniques: TPO-MS, TG, DTA, SEM-EDS, x-ray diffraction and TPR, and the reasons for the deactivation of the catalyst were studied. It's shown that, deposited carbon and deposited metals on the catalysts were the main factors resulting in the deactivation, and state of the active elements on the catalysts can be restored and improved by removing the deposited carbon and deposited metals. The method used to unload the deactivated catalysts from industrial reactor also has some effect on their

ST chemicophys. properties.

ST deactivation molybdenum nickel alumina catalyst

hydrodesulfurization

IT Decoking

Hydrodesulfurization

Hydrodesulfurization catalysts

(deactivation of NiMo/.gamma.-Al<sub>2</sub>O<sub>3</sub> catalysts for hydrodesulfurization of heavy oil)

IT 1344-28-1, Alumina, uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses

RL: CAT (Catalyst use); USES (Uses)

(deactivation of NiMo/.gamma.-Al<sub>2</sub>O<sub>3</sub> catalysts for hydrodesulfurization of heavy oil)

IT 7440-44-0, Carbon, reactions

RL: FMU (Formation, unclassified); RCT (Reactant); REM (Removal or disposal); FORM (Formation, nonpreparative); PROC (Process)

(deactivation of NiMo/.gamma.-Al<sub>2</sub>O<sub>3</sub> catalysts for hydrodesulfurization of heavy oil)

L5 ANSWER 8 OF 18 HCAPLUS COPYRIGHT 2001 ACS

AN 1999:524973 HCAPLUS

DN 131:173666

TI Sol-gel synthesis and characterization of various oxide aerogels and NiO and Pd supported on aerogels

AU Knez, Zeljko; Novak, Z.

CS Faculty Chemistry Chemical Engineering, Univ. Maribor, Maribor, SI-2000, Slovenia

SO Wiss. Ber. - Forschungszent. Karlsruhe (1999), FZKA 6271, High Pressure Chemical Engineering, 133-136

CODEN: WBFKF5; ISSN: 0947-8620

DT Report

LA English

CC 57-2 (Ceramics)

Section cross-reference(s): 66, 67

AB The prepn. and characterization of aerogels of metal oxides (SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, and TiO<sub>2</sub>), binary mixed oxides (SiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub> and SiO<sub>2</sub>-TiO<sub>2</sub>), and various

NiO aerogels (NiO-Al<sub>2</sub>O<sub>3</sub>, NiO-SiO<sub>2</sub>, and NiO-SiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>), and Pd aerogels (Pd-Al<sub>2</sub>O<sub>3</sub> and Pd-SiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>) is presented. The prepn. of aerogels includes several steps: sol-gel synthesis, drying and, finally, thermal treatment. Excellent properties of aerogels, obtained with the sol-gel synthesis, were preserved with supercrit. drying with CO<sub>2</sub>. Due to this fact, supercrit. drying was carried out at the conditions above the binary crit. curve of the solvent - CO<sub>2</sub>, where the solvent and CO<sub>2</sub> are completely miscible. All produced aerogels were characterized by N physisorption at 77 K, single point BET surface area measurements (adsorption of Ar-N gas mixt.), x-ray diffraction, and thermal anal.

ST silica alumina aerogel sol gel supercrit drying carbon oxide; titania aerogel sol gel supercrit drying carbon oxide; palladium nickel oxide aerogel support sol gel

IT Aerogels

Sol-gel processing

(sol-gel processing and characterization of various oxide aerogels and NiO and Pd supported on aerogels)

IT Surface area

Thermal decomposition

(sol-gel processing and characterization of various oxide aerogels and

NiO and Pd supported on aerogels in relation to)

IT Hydrogenation **catalysts**  
(sol-gel processing and characterization of various oxide aerogels and NiO and Pd supported on aerogels used as)

IT Soybean oil  
RL: NUU (Nonbiological use, unclassified); USES (Uses)  
(sol-gel processing and characterization of various oxide aerogels and NiO and Pd supported on aerogels used as hydrogenation **catalysts of**)

IT Drying  
(**supercrit.**; sol-gel processing and characterization of various oxide aerogels and NiO and Pd supported on aerogels in relation to)

IT 7440-05-3, Palladium, properties  
RL: CAT (Catalyst use); PRP (Properties); USES (Uses)  
(sol-gel processing and characterization of various oxide aerogels and NiO and Pd supported on aerogels)

IT 1344-28-1, Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>), processes 7631-86-9, Silica, processes 13463-67-7, Titania, processes 52337-09-4, Silicon titanium oxide 159995-97-8, Aluminum silicon oxide  
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)  
(sol-gel processing and characterization of various oxide aerogels and NiO and Pd supported on aerogels)

IT 1313-99-1, Nickel oxide (NiO), properties  
RL: PRP (Properties)  
(sol-gel processing and characterization of various oxide aerogels and NiO and Pd supported on aerogels)

IT 124-38-9, Carbon dioxide, uses  
RL: NUU (Nonbiological use, unclassified); USES (Uses)  
(sol-gel processing and characterization of various oxide aerogels and NiO and Pd supported on aerogels in relation to **supercrit.** drying with)

RE.CNT 14

RE

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Springer Proceedings in Physic 1986, V6
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L5 ANSWER 9 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
AN 1999:491579 HCAPLUS  
DN 131:187128  
TI Coking of Hydroprocessing Catalyst by Residue Fractions of Bitumen  
AU Gray, Murray R.; Zhao, Yingxian; McKnight, Craig M.; Komar, David A.; Carruthers, J. Donald  
CS Department of Chemical and Materials Engineering, University of Alberta, Edmonton, AB, T6G 2G6, Can.  
SO Energy Fuels (1999), 13(5), 1037-1045  
CODEN: ENFUEM; ISSN: 0887-0624  
PB American Chemical Society  
DT Journal  
LA English  
CC 51-10 (Fossil Fuels, Derivatives, and Related Products)  
AB The deposition of org. material, or coke, on hydroprocessing catalyst was studied using Athabasca bitumen vacuum residue (ABVB) and narrow fractions of ABVB, prep'd. by supercrit. fluid extn. (SCFE) with n-pentane. The feed materials were dild. in a low-sulfur gas oil and hydroprocessed over a com. Ni-Mo/.gamma.-Al<sub>2</sub>O<sub>3</sub> catalyst in a 1 L continuous-stirred tank reactor at 440 .degree.C. The coked catalysts were Soxhlet extd. with methylene chloride; then, carbon content, surface area, pore vol., and pore size were measured. Hydrodesulfurization activity was then measured using bitumen and dibenzothiophene as reactants. The SCFE fractions that contained only sats., aroms., and resins gave a low yield of carbon on the catalyst (<7.5 wt %). The asphaltene-rich fraction gave higher coke yields, both on the catalyst and in the reactor, and a lower H/C ratio than the lighter fractions. In the worst case with asphaltene-rich feed, over half of the surface area and pore vol. of catalyst was lost due to coke deposition on the catalyst. HDS activity of the spent catalyst decreased monotonically with increasing carbon content on the catalyst. A portion of the carbonaceous material, or coke, on the catalyst was mobile and reactive at the conditions used for hydroprocessing of bitumen. The data suggested that this mobile adsorbed material had a significant impact on the obsd. activity of the catalyst.  
ST hydroprocessing catalyst coking bitumen residue  
IT Hydrodesulfurization  
IT Petroleum hydrotreating catalysts  
    (coking of hydroprocessing catalyst by residue fractions of bitumen)  
IT Asphaltenes  
    RL: PEP (Physical, engineering or chemical process); PROC (Process)  
        (coking of hydroprocessing catalyst by residue fractions of bitumen)  
IT 7440-02-0, Nickel, uses  
    RL: CAT (Catalyst use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
        (contg. molybdenum and alumina; coking of hydroprocessing catalyst by residue fractions of bitumen)  
IT 7439-98-7, Molybdenum, uses  
    RL: CAT (Catalyst use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
        (contg. nickel and alumina; coking of hydroprocessing

catalyst by residue fractions of bitumen)

IT 132-65-0, Dibenzothiophene  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (hydrodesulfurization activity of coked hydroprocessing catalyst)

RE.CNT 16

RE

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- (8) Gray, M; Energy Fuels 1995, V9, P500 HCPLUS
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- (15) Ternan, M; Fuel Process Technol 1979, V2, P45 HCPLUS
- (16) Thakur, D; Appl Catal 1985, V15, P197 HCPLUS

L5 ANSWER 10 OF 18 HCPLUS COPYRIGHT 2001 ACS

AN 1998:760096 HCPLUS

DN 130:15125

TI Method for continuous catalytic reaction of organic compounds

IN Tacke, Thomas; Roeder, Stefan; Beul, Inge; Laporte, Steffen

PA Degussa A.-G., Germany

SO Ger. Offen., 16 pp.

CODEN: GWXXBX

DT Patent

LA German

IC ICM C07B035-02

ICS C07C053-126; C07C051-36; C07C069-22; C07C069-24; C07C069-30;  
 C07C067-303; C07C067-02; C07C067-08; C11C003-12; C07B041-12

ICA C07B041-06; C07B037-04

CC 45-3 (Industrial Organic Chemicals, Leather, Fats, and Waxes)  
 Section cross-reference(s): 48

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	DE 19719431	A1	19981119	DE 1997-19719431	19970512
	EP 878534	A2	19981118	EP 1998-104688	19980316
	EP 878534	A3	20000202		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	US 6316646	B1	20011113	US 1998-73810	19980507
	JP 10316592	A2	19981202	JP 1998-128678	19980512
PRAI	DE 1997-19719431	A	19970512		
AB	The process, esp. for hydrogenation of fats and their derivs., involves extn. of reactants from an impure feed with a condensed fluid (e.g., supercrit. CO <sub>2</sub> ), passage of the ext. over a catalyst under reaction conditions, sepn. of the products from the unchanged reactants and extractant, and recycle of the latter. Thus, a crude fatty				

acid mixt. was extd. into 27:5 CO<sub>2</sub>-propane at 80.degree./200 bars and the ext. was passed over a catalyst of Pd supported on a functionalized polysiloxane at 140-190.degree./200 bars (temp. increasing in stages to compensate for loss of catalyst activity) and liq. hourly space velocity .apprx.1 for .apprx.240 h to produce fatty acids with I no. 1-2 at a throughput of .apprx.800 g/g catalyst.

ST fatty acid continuous hydrogenation; liquefied gas medium hydrogenation fat

IT Alcohols, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(C1-6, solubilizers; continuous catalytic reaction of org. compds.)

IT Platinum-group metals  
RL: CAT (Catalyst use); USES (Uses)  
(catalysts; continuous catalytic hydrogenation of org. compds.)

IT Hydrogenation  
(continuous catalytic hydrogenation of org. compds.)

IT Fats and Glyceridic oils, reactions  
Fatty acid esters  
Fatty acids, reactions  
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process)  
(continuous catalytic hydrogenation of org. compds.)

IT Extraction  
(continuous catalytic reaction of org. compds. after)

IT 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses  
7440-50-8, Copper, uses  
RL: CAT (Catalyst use); USES (Uses)  
(catalysts; continuous catalytic hydrogenation of org. compds.)

IT 544-35-4, Ethyl linoleate  
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process)  
(continuous catalytic hydrogenation of org. compds.)

IT 74-84-0, Ethane, uses 74-98-6, Propane, uses 106-97-8, Butane, uses  
124-38-9, Carbon dioxide, uses 10024-97-2, Nitrogen oxide (N<sub>2</sub>O), uses  
RL: NUU (Nonbiological use, unclassified); USES (Uses)  
(liquefied, extractant; continuous catalytic reaction of org. compds.)

IT 67-64-1, Acetone, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(solubilizer; continuous catalytic reaction of org. compds.)

L5 ANSWER 11 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
AN 1998:552505 HCAPLUS  
DN 129:247395  
TI Characteristics on HDS and HDN kinetics of narrow fractions from residua  
AU Yang, Chaohe; Du, Feng; Xu, Chunming  
CS State Key Laboratory of Heavy Oil Processing, University of Petroleum,  
Dongying city, 257062, Peop. Rep. China  
SO Prepr. Symp. - Am. Chem. Soc., Div. Fuel Chem. (1998), 43(3), 751-757  
CODEN: PSADFZ  
PB American Chemical Society, Division of Fuel Chemistry  
DT Journal  
LA English  
CC 51-6 (Fossil Fuels, Derivatives, and Related Products)  
AB An atm. residuum from Dagang crude of China(DGAR) and two vacuum residua  
from Arabian Light crude and Arabian Medium crude(SQVR and SZVR) were  
fractionated into 7-8 cuts by supercrit. fluid extn.

fractionation (SFEF) technique developed by State Key Lab. of Heavy Oil Processing. These SFEF fractions were catalytically hydroprocessed in a 100 mL autoclave with crushed com. Ni-Mo **catalyst**. The HDS and HDN diffusion-reaction model of residue in autoclave reactor was established. The diffusion and HDS and HDN characteristics of these fractions were discussed.

ST hydrodesulfurization hydrodenitrogenation kinetics narrow fraction; petroleum residue **supercrit** fluid extn

IT Diffusion

Hydrodesulfurization

Petroleum fractions

Petroleum hydrotreating **catalysts**

Petroleum refining residues

Physicochemical simulation

Reaction kinetics

**supercritical** fluid extraction

(characteristics on HDS and HDN kinetics of narrow fractions from residua)

IT Petroleum refining

(hydrodenitrogenation; characteristics on HDS and HDN kinetics of narrow fractions from residua)

IT 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses  
RL: CAT (Catalyst use); USES (Uses)

(characteristics on HDS and HDN kinetics of narrow fractions from residua)

L5 ANSWER 12 OF 18 HCPLUS COPYRIGHT 2001 ACS

AN 1998:552504 HCPLUS

DN 129:247394

TI Hydroconversion characteristics on narrow fractions of residua

AU Yang, Chaohe; Zhang, Jianfang; Xu, Chunming; Lin, Shixong

CS State Key Laboratory of Heavy Oil Processing, University of Petroleum, Dongying city, 257062, Peop. Rep. China

SO Prepr. Symp. - Am. Chem. Soc., Div. Fuel Chem. (1998), 43(3), 746-750

CODEN: PSADFZ

PB American Chemical Society, Division of Fuel Chemistry

DT Journal

LA English

CC 51-6 (Fossil Fuels, Derivatives, and Related Products)

AB An atm. residuum from Dagang crude of China(DGAR) and two vacuum residua from Arabian Light crude and Arabian Medium crude(SQVR and SZVR) were fractionated into 7-8 cuts by **supercrit**. fluid extn. fractionation (SFEF) technique developed by State Key Lab. of Heavy Oil Processing. The major properties of these fractions were measured, and each fraction was catalytically hydroprocessed in a 100 mL autoclave with crushed com. Ni-Mo **catalyst** at the same reaction conditions. Removal of sulfur and nitrogen decreases with increase of the av. mol. wt.(AMW) of the feedstock, but the total conversion of heavy portion greater than 500 for every fraction is similar. The yield of coke increases with increasing AMW of feed, esp. for the several heavier fractions, and the SFEF residue inhibits the HDS and HDN of other SFEF fractions to a certain extent.

ST hydroconversion narrow fraction residue **supercrit** extn

IT Hydrodesulfurization

Petroleum fractions

Petroleum refining residues

**supercritical** fluid extraction  
(hydroconversion characteristics on narrow fractions of residua)

IT Coke  
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)  
(hydroconversion characteristics on narrow fractions of residua)

IT Petroleum refining  
(hydrodenitrogenation; hydroconversion characteristics on narrow fractions of residua)

IT 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses  
RL: CAT (Catalyst use); USES (Uses)  
(hydroconversion characteristics on narrow fractions of residua)

L5 ANSWER 13 OF 18 HCPLUS COPYRIGHT 2001 ACS  
AN 1997:670757 HCPLUS  
DN 127:295615

TI Catalytic hydrogenating desulfurization of heavy oil through partial oxidation in **supercritical** water  
AU Adschariri, T.; Sato, T.; Shibata, R.; Arai, K.  
CS Department Chemical Engineering, Tohoku University, Sendai, 980, Japan  
SO DGMK Tagungsber. (1997), 9704(Proceedings ICCS '97, Volume 3), 1505-1508  
CODEN: DGTAF7; ISSN: 1433-9013

PB Deutsche Wissenschaftliche Gesellschaft fuer Erdoel, Erdgas und Kohle  
DT Journal  
LA English  
CC 51-9 (Fossil Fuels, Derivatives, and Related Products)  
AB We show that the effective hydrogenating atm. can be supplied through the partial oxidn. of hydrocarbon in **supercrit.** water (SCW). We conducted expts. of dibenzothiophene (DBT) hydrogenation with NiMo/Al2O3 at 673 K and 30 MPa, in various atmospheres, using a tube bomb reactor. Higher conversion of DBT was obtained in CO-SCW, CO2-H2-SCW, HCOOH-SCW than in H2-SCW. These results clearly indicate that water-gas shift reaction (CO + H2O .fwdarw. CO2 + H2) in SCW produces the species which can hydrogenate DBT more effectively than H2 gas. Next, we conducted another expt. for partial oxidn. of DBT-hexylbenzene soln. in SCW, effective hydrogenation of DBT took place. This result is probably because CO forms through the partial oxidn. of hexylbenzene and converts to the hydrogenating species through water-gas shift reaction.

ST catalytic hydrogenating desulfurization heavy oil oxidn;  
**supercrit** water oxidn dibenzothiophene hydrogenating  
desulfurization; water gas shift reaction hydrogenating desulfurization

IT Desulfurization catalysts  
Oxidation  
Water gas shift reaction  
(catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in **supercrit.** water)

IT Heavy petroleum  
RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in **supercrit.** water)

IT Desulfurization  
(hydrogenating; catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in **supercrit.** water)

IT 630-08-0, Carbon monoxide, processes  
RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in CO-**supercrit.** water system)

IT 1333-74-0, Hydrogen, processes  
RL: PEP (Physical, engineering or chemical process); PROC (Process)

(catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in CO<sub>2</sub>-H<sub>2</sub>- and H<sub>2</sub>-supercrit. water system)

IT 124-38-9, Carbon dioxide, processes  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in CO<sub>2</sub>-H<sub>2</sub>-supercrit. water system)

IT 64-18-6, Formic acid, processes  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in HCO<sub>2</sub>H-supercrit. water system)

IT 1077-16-3, Hexylbenzene  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in supercrit. water exemplified by dibenzylthiophene soln. in)

IT 7439-98-7, Molybdenum, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in supercrit. water with)

IT 7440-02-0, Nickel, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in supercrit. water with NiMo/Al<sub>2</sub>O<sub>3</sub> catalyst)

IT 92-52-4P, Biphenyl, preparation 827-52-1P, Cyclohexylbenzene  
 RL: PNU (Preparation, unclassified); PREP (Preparation)  
 (major product in catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in H<sub>2</sub>-supercrit. water)

IT 132-65-0, Dibenzothiophene  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (model compd.; catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in supercrit. water exemplified by)

IT 7732-18-5, Water, processes  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (supercrit.; catalytic hydrogenating desulfurization of heavy oil through partial oxidn. in supercrit. water)

LS ANSWER 14 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
AN 1995:899014 HCAPLUS  
DN 123:290382  
TI Hydrogenation and hardening of unsaturated fats, fatty acids or fatty acid esters  
IN Tacke, Thomas; Wieland, Stefan; Panster, Peter; Bankmann, Martin;  
Maegerlein, Hendrik  
PA Degussa AG, Germany  
SO Ger. Offen., 13 pp.  
CODEN: GWXXBX  
DT Patent  
LA German  
IC ICM C07C069-30  
      ICS C07C069-24; C07C067-303; C07C051-36; B01J023-72; C11C003-12  
ICI C07M009-00  
CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)  
Section cross-reference(s): 17, 23  
FAN.CNT 1  
PATENT NO.           KIND DATE           APPLICATION NO.   DATE

PI	DE 4405029	A1	19950824	DE 1994-4405029	19940217
	DE 4405029	C2	19960404		
	CA 2182781	AA	19950824	CA 1995-2182781	19950209
	WO 9522591	A1	19950824	WO 1995-EP456	19950209
	W: AM, AU, BB, BG, BR, BY, CA, CN, CZ, EE, FI, GE, HU, JP, KG, KP, KR, KZ, LK, LR, LT, LV, MD, MG, MN, MX, NO, NZ, PL, RO, RU, SI, SK, TJ, TT, UA, US, UZ, VN				
	RW: KE, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
	AU 9518082	A1	19950904	AU 1995-18082	19950209
	AU 677900	B2	19970508		
	EP 745116	A1	19961204	EP 1995-909690	19950209
	EP 745116	B1	19981118		
	R: BE, CH, DE, DK, ES, FR, GB, IT, LI, NL, PT, SE				
	CN 1140465	A	19970115	CN 1995-191599	19950209
	JP 09509440	T2	19970922	JP 1995-521550	19950209
	BR 9506806	A	19970930	BR 1995-6806	19950209
	ES 2126884	T3	19990401	ES 1995-909690	19950209
	US 5734070	A	19980331	US 1996-689836	19960814
PRAI	DE 1994-4405029	A	19940217		
	WO 1995-EP456	W	19950209		
AB	Edible unsatd. fats, fatty acids, or fatty acid esters are hydrogenated for hardening with H <sub>2</sub> at using Pt-group metals, Ni, or Cu on spherical 0.1-3 mm supports (ceramic foam or metal honeycomb) with promoters at a temp. of 1-10 times the solvent crit. temp. (-120 to 250.degree.) and a pressure 0.8-6 times the crit. pressure (20-200 bar).				
ST	fatty acid hydrogenation hardening				
IT	Hydrogenation catalysts (Pt-group metals, Ni, Cu; hydrogenation and hardening of edible unsatd.				
	fats, fatty acids or fatty acid esters)				
IT	Siloxanes and Silicones, uses				
	RL: NUU (Nonbiological use, unclassified); USES (Uses) (condensation polymers, catalyst supports; hydrogenation and hardening of edible unsatd. fats, fatty acids or fatty acid esters)				
IT	Fats and Glyceridic oils				
	Fatty acids, preparation				
	RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation) (edible unsatd.; hydrogenation and hardening of edible unsatd. fats, fatty acids or fatty acid esters)				
IT	Hardening				
	Hydrogenation (hydrogenation and hardening of edible unsatd. fats, fatty acids or fatty acid esters)				
IT	Platinum-group metals				
	RL: CAT (Catalyst use); USES (Uses) (hydrogenation and hardening of edible unsatd. fats, fatty acids or fatty acid esters)				
IT	Fatty acids, preparation				
	RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation) (esters, edible unsatd.; hydrogenation and hardening of edible unsatd. fats, fatty acids or fatty acid esters)				
IT	1344-28-1, Alumina, uses 7440-44-0, Carbon, uses 7631-86-9, Silica, uses 9003-53-6, Polystyrene 13463-67-7, Titania, uses				
	RL: CAT (Catalyst use); USES (Uses) (catalyst support; hydrogenation and hardening of edible				

IT        unsatd. fats, fatty acids or fatty acid esters)  
IT    7440-02-0, Nickel, uses 7440-50-8, Copper, uses  
RL: CAT (Catalyst use); USES (Uses)  
      (hydrogenation and hardening of edible unsatd. fats, fatty acids or  
      fatty acid esters)  
IT    544-35-4P, Linoleic acid ethyl ester  
RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation)  
      (hydrogenation and hardening of edible unsatd. fats, fatty acids or  
      fatty acid esters)  
IT    1333-74-0, Hydrogen, reactions  
RL: RCT (Reactant)  
      (hydrogenation and hardening of edible unsatd. fats, fatty acids or  
      fatty acid esters)  
IT    74-98-6, Propane, uses 109-66-0, Pentane, uses 124-38-9, Carbon  
dioxide, uses 10024-97-2, Dinitrogen monoxide, uses 10102-43-9,  
Nitrogen monoxide, uses  
RL: NUU (Nonbiological use, unclassified); USES (Uses)  
      (supercrit.; hydrogenation and hardening of edible unsatd.  
      fats, fatty acids or fatty acid esters)

L5    ANSWER 15 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
AN    1993:127921 HCAPLUS  
DN    118:127921  
TI    Titania-zirconia mixed oxide aerogels as supports for hydrotreating  
      catalysts  
AU    Weissman, J. G.; Ko, E. I.; Kaytal, S.  
CS    Texaco Inc., P.O. Box 509, Beacon, NY, USA  
SO    Appl. Catal., A (1993), 94(1), 45-59  
      CODEN: ACAGE4  
DT    Journal  
LA    English  
CC    51-9 (Fossil Fuels, Derivatives, and Related Products)  
      Section cross-reference(s): 49, 67  
AB    Supercrit. fluid (SFC) extn. was used to make aerogels of TiO<sub>2</sub>,  
ZrO<sub>2</sub>, and two TiO<sub>2</sub>-ZrO<sub>2</sub> mixed oxides with surface areas 2-5 times greater  
than their conventionally prep'd. equiv.; addnl. the mixed oxides had  
higher surface acidities than the two single component oxides. Heat  
treatments, either during catalyst prepn. or reactor testing,  
always resulted in small-to-significant decreases in surface areas in the  
aerogel-contg. samples. These samples were used as supports for Mo-Ni  
catalysts for the hydroprocessing of gas oil in a  
pilot-plant scale reactor. The high-ZrO<sub>2</sub> materials were unstable under  
reaction conditions and nearly inactive; in contrast, the high-TiO<sub>2</sub>  
catalysts, while somewhat unstable, were more active on a surface  
area basis than Al<sub>2</sub>O<sub>3</sub> or conventional TiO<sub>2</sub> equivalent supported Mo-Ni  
catalysts. This improvement is attributed to properties inherent  
in the SCF-prepd. supports; these results also indicate that support  
acidity contributes to hydrotreating activity.  
ST    gas oil hydroprocessing catalyst support; molybdenum  
      nickel hydroprocessing catalyst; titania zirconia  
      support prep'n supercrit extn  
IT    Gas oils  
      (hydroprocessing of, catalyst for, molybdenum-nickel  
      on titania-zirconia aerogel as)  
IT    Aerogels  
      (titania-zirconia, support, for molybdenum-nickel  
      catalysts, for hydroprocessing of gas oil)  
IT    Petroleum refining catalysts

(hydroprocessing, molybdenum-nickel, on titania-zirconia aerogel, for hydroprocessing of gas oil)

IT 1314-23-4P, Zirconia, uses  
RL: PREP (Preparation)  
(aerogel, contg. titania, prepn. of, by **supercrit.** fluid extn., as support for molybdenum-nickel hydroprocessing **catalyst**)

IT 13463-67-7P, Titania, uses  
RL: PREP (Preparation)  
(aerogel, contg. zirconia, prepn. of, by **supercrit.** fluid extn., as support for molybdenum nickel hydroprocessing **catalyst**)

IT 7440-02-0, Nickel, uses  
RL: CAT (Catalyst use); USES (Uses)  
(catalyst, contg. molybdenum, on titania-zirconia aerogel, for hydroprocessing of gas oil)

IT 7439-98-7, Molybdenum, uses  
RL: CAT (Catalyst use); USES (Uses)  
(catalyst, contg. nickel, on titania-zirconia aerogel, for hydroprocessing of gas oil)

L5 ANSWER 16 OF 18 HCAPLUS COPYRIGHT 2001 ACS  
AN 1990:182671 HCAPLUS  
DN 112:182671  
TI Chemical structure and susceptibility to hydrogenation of heavy coal derived liquids  
AU Surygala, J.; Sliwka, E.  
CS Inst. Chem. Tech. Pet. Coal, Tech. Univ. Wroclaw, Wroclaw, 50-344, Pol.  
SO Proc. - Annu. Int. Pittsburgh Coal Conf. (1989), 6th(2), 711-18  
CODEN: PICNE4  
DT Journal  
LA English  
CC 51-21 (Fossil Fuels, Derivatives, and Related Products)  
Section cross-reference(s): 67  
AB Six coal liqs., 3 flash pyrolysis tars, 2 **supercrit.** exts., and a hydrogenated anthracene oil ext., were analyzed for their compn., and a no. of **catalysts** for the hydroprocessing of these liqs. were evaluated. The brown-coal exts. and tars had relative high concns. of H (8-9%) and O (8-12%), but their arom. C concns. were relatively low (0.4-0.5). The coal exts. had less H (6-7%) and O (4-5%) but more arom. C (0.7-0.8). A Co-Mo/Al<sub>2</sub>O<sub>3</sub> **catalyst** was suitable for brown-coal liq. hydroprocessing, but Ni-Mo/Al<sub>2</sub>O<sub>3</sub> and Ni-Co-Mo/Al<sub>2</sub>O<sub>3</sub> **catalysts** were more suitable for the coal liqs.  
ST coal brown liq compn hydroprocessing; ext pyrolysis tar **catalyst** hydroprocessing  
IT Coal liquids  
(brown, hydroprocessing of, **catalysts** for)  
IT Coal liquids  
(exts., hydroprocessing of, **catalysts** for)  
IT Petroleum refining **catalysts**  
(hydroprocessing, of coal liqs., evaluation of)  
IT Coal liquids  
(pyrolysis oils, hydroprocessing of, **catalysts** for)  
IT 7439-98-7, Molybdenum, uses and miscellaneous  
RL: CAT (Catalyst use); USES (Uses)  
(catalyst, contg. cobalt and nickel and alumina, for coal liq. hydroprocessing)  
IT 7440-48-4, Cobalt, uses and miscellaneous

RL: CAT (Catalyst use); USES (Uses)  
 (catalyst, contg. molybdenum and nickel and alumina, for coal liq. hydroprocessing)  
 IT 7440-02-0, Nickel, uses and miscellaneous  
 RL: CAT (Catalyst use); USES (Uses)  
 (catalysts, contg. cobalt and molybdenum and alumina, for coal liq. hydroprocessing)  
 IT 1317-39-1, Cuprous oxide, uses and miscellaneous 7439-89-6, Iron, uses and miscellaneous 12627-71-3, Tungsten sulfide  
 RL: CAT (Catalyst use); USES (Uses)  
 (catalysts, for coal liq. hydroprocessing)

L5 ANSWER 17 OF 18 HCPLUS COPYRIGHT 2001 ACS  
 AN 1986:227641 HCPLUS  
 DN 104:227641  
 TI Selective extraction of hydrocarbons from asphaltic petroleum oils  
 IN Yan, Tsoung Yuan; Audeh, Costandi A.  
 PA Mobil Oil Corp., USA  
 SO Can., 18 pp.  
 CODEN: CAXXA4  
 DT Patent  
 LA English  
 IC ICM C10G021-00  
 CC 51-10 (Fossil Fuels, Derivatives, and Related Products)  
 FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	CA 1198996	A1	19860107	CA 1982-407675	19820720
AB	Petroleum residues are deasphalting by extn. with a low mol. wt. org. solvent (crit. temp. .gt;= 200.degree.C) at or above the crit. temp. and crit. pressure of the solvent. The asphaltenes and metal contaminants are agglomerated and sepd.; the ext. is then fractionated to recover a deasphalted oil and the solvent. Catalysts can be added during the extn. to improve the deasphalted oil yield and to reduce metal content. Thus, a vacuum residue (contg. 22 ppm Ni and 220 ppm V) was extd. with a catalytically cracked gasoline at 725.degree.F and 650 psig to form an asphaltic heavy phase and a deasphalted oil -solvent ext. phase; the ext. phase was sepd. and distd. to recover the deasphalted oil and the solvent. The product contained 76 wt.% deasphalted oil with 2 ppm Ni and 12 ppm V.				
ST	petroleum refining deasphalting solvent extn; gasoline extn petroleum residue deasphalting; supercrit deasphalting demetalation petroleum residue; asphaltene demetalation demetalation petroleum residue; nickel removal demetalation petroleum residue; vanadium removal demetalation petroleum residue				
IT	Gasoline RL: USES (Uses) (catalytically cracked, supercrit. extn. solvent, for deasphalting and demetalation of petroleum residues)				
IT	Asphaltenes RL: REM (Removal or disposal); PROC (Process) (removal of, from petroleum refining residues, by supercrit. extn. with catalytically cracked gasoline)				

IT Solvent naphtha  
     (**supercrit.** extn. of, for deasphalting and demetalation of  
     petroleum residues)  
 IT Petroleum products  
     (cycle oils, **supercrit.** extn. solvents, for  
     deasphalting and demetalation of petroleum residues)  
 IT Petroleum refining  
     (deasphalting-demetalation, of vacuum residues, by extn. with  
     **supercrit.** solvents)  
 IT Petroleum refining residues  
     (vacuum distn., deasphalting and demetalation of, by **supercrit**  
     . extn. with catalytically cracked gasoline)  
 IT 7440-02-0, uses and miscellaneous 7440-62-2, uses and miscellaneous  
     RL: REM (Removal or disposal); PROC (Process)  
     (removal of, from petroleum refining residues, by **supercrit.**  
     extn. with catalytically cracked gasoline)  
 IT 67-56-1, uses and miscellaneous 109-66-0, uses and miscellaneous  
     RL: USES (Uses)  
     (**supercrit.** extn. solvent, for deasphalting and demetalation  
     of petroleum residues)  
 IT 71-43-2, uses and miscellaneous 108-88-3, uses and miscellaneous  
     RL: USES (Uses)  
     (**supercrit.** extn. solvents, for deasphalting and demetalation  
     of petroleum residues)

L5 ANSWER 18 OF 18 HCAPLUS COPYRIGHT 2001 ACS

AN 1983:542956 HCAPLUS

DN 99:142956

TI Hydrotreating **supercritical** solvent extracts in the presence of  
 alkane extractants

IN Low, Jim Y.

PA Phillips Petroleum Co. , USA

SO U.S., 4 pp.

CODEN: USXXAM

DT Patent

LA English

IC C10G001-04; C10G021-14

NCL 208011000LE

CC 51-13 (Fossil Fuels, Derivatives, and Related Products)

Section cross-reference(s): 67

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 4397736	A	19830809	US 1981-249804	19810401
	US 32120	E	19860422	US 1984-572713	19840120
PRAI	US 1981-249804		19810401		
AB	Hydrocarbons are recovered from naturally-occurring carbonaceous materials of low org. C content (i.e., oil shale and/or tar sand) by contacting the materials under <b>supercrit.</b> conditions with a mixt. of structurally analogous hydrocarbon solvents. The solvents comprise .gt;req.1 arom. solvent and .gt;req.1 cycloaliph. solvent, with the latter being structurally analogous to the arom. solvent and comprising 5-10 wt.% of the total solvent wt. The carbonaceous material can be hydrotreated in the presence of the solvent mixt. either during or after the extn. step. Thus, Paraho shale oil (1 wt. part) was dissolved in 4 wt. parts solvent and hydrotreated at 850 .degree.F, 1.6 h-1 liq. space velocity, and 300 h-1 H space velocity over Mo-Ni. When				

PhMe [108-88-3] was the solvent, .apprx.5-7% of the PhMe was hydrogenated

to methylcyclohexane (I) [108-87-2]. When the solvent comprised PhMe contg. 5% I, very little solvent was hydrogenated, H consumption was substantially reduced, and conversion was increased.

ST shale oil hydrotreating **supercrit** solvent; toluene  
**supercrit** solvent hydrotreating oil; methylcyclohexane  
**supercrit** solvent hydrotreating oil; molybdenum  
nickel catalyst hydrotreating oil; oil  
shale sand **supercrit** extn

IT Oil sand  
    Oil shale  
    RL: PROC (Process)  
        (extn. of, by **supercrit**. solvent mixts.)

IT Petroleum recovery  
    (from oil sand and oil shale, by extn. with  
    **supercrit**. solvent mixts.)

IT Petroleum refining **catalysts**  
    (hydrorefining, molybdenum-nickel, for shale oils  
    in **supercrit**. mixed solvents)

IT Petroleum refining  
    (hydrorefining, of shale oils in mixed solvents under  
    **supercrit**. conditions)

IT 7440-02-0, uses and miscellaneous  
    RL: CAT (Catalyst use); USES (Uses)  
        (catalysts, contg. molybdenum for hydrorefining of shale  
        oils in **supercrit**. mixed solvents)

IT 7439-98-7, uses and miscellaneous  
    RL: CAT (Catalyst use); USES (Uses)  
        (catalysts, contg. nickel for hydrorefining of  
        shale oils in **supercrit**. mixed solvents)

IT 71-43-2, uses and miscellaneous 108-87-2 108-88-3, uses and  
    miscellaneous 110-82-7, uses and miscellaneous  
    RL: USES (Uses)  
        (solvents contg., shale oil hydrorefining in presence of,  
        under **supercrit**. conditions)